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Barry Felrice,

Associate Administrator for Rulemaking.

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DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

Endangered and Threatened Wildlife and Plants; 90-day Finding on a Petition To Delist Seven Texas Karst Invertebrates

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Notice of petition finding.

SUMMARY: The U.S. Fish and Wildlife Service (Service) announces a 90-day finding on a petition to remove seven species of invertebrates that occur in karst topography in Travis and Williamson counties, Texas, from the List of Endangered and Threatened Wildlife and Plants. The Service determines that the petition does not present substantial scientific or commercial information indicating that delisting the Coffin Cave mold beetle (*Batrisodes texanus*), the Tooth Cave spider (*Neoleptoneta myopica*), the Tooth Cave ground beetle (*Rhadine persephone*), the Tooth Cave pseudoscorpion (*Tartarocreagris texana*), the Kretschmarr Cave mold beetle (*Texamaurops reddelli*), the Bee Creek Cave harvestman (*Texella reddelli*), and the Bone Cave harvestman (*Texella reyesi*) may be warranted.

DATES: The finding announced in this notice was made on March 7, 1994. Comments and information related to this petition finding may be submitted until further notice.

ADDRESSES: Information, comments, or questions may be submitted to the State Administrator, U.S. Fish and Wildlife Service, Ecological Services Field Office, 611 East 6th Street, room 407, Austin, Texas 78701. The petition, finding, supporting data, and comments will be available for public inspection, by appointment, during normal business hours at the above address.

FOR FURTHER INFORMATION CONTACT: Ruth Stanford, Ecologist, at the above address (512/482-5436).

SUPPLEMENTARY INFORMATION:

Background

Section 4(b)(3)(A) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act), requires that the Service make a finding on whether a petition to list, delist, or reclassify a species presents substantial scientific or commercial information indicating that the petitioned action may be warranted. To the maximum extent practicable, this finding is to be made within 90 days of receipt of the petition, and the finding is to be published promptly in the **Federal Register**. If the finding is positive, the Service is also required to promptly commence a status review of the species.

Judge John C. Doerfler, representing the Williamson County Commissioners Court, submitted a petition to the Service to delist six species of endangered karst invertebrates in Travis and Williamson counties, Texas. The petition was dated June 7, 1993, and received by the Service on that date. On June 16, 1993, the Service received a letter from attorney J.B. Ruhl on behalf of the petitioners, clarifying the intent of the petition to incorporate recent taxonomic revisions and the taxonomic reevaluation of five listed karst invertebrate species as seven species.

The final rule listing the Tooth Cave pseudoscorpion (*Microgreagris texana*), the Tooth Cave spider (*Leptoneta myopica*), the Bee Creek Cave harvestman (*Texella reddelli*), the Tooth Cave ground beetle (*Rhadine persephone*), and the Kretschmarr Cave mold beetle (*Texamaurops reddelli*) as endangered species was published in the **Federal Register** on September 16, 1988 (53 FR 36029) (final rule). Subsequent taxonomic revisions have formalized genus reassignments for *M. texana* and *L. myopica* and established that *Texella reddelli* and *Texamaurops reddelli* each actually comprise two species. *Microcreagris texana* has been reassigned to *Tartarocreagris texana* (Muchmore 1992). *Leptoneta myopica* has been formally reassigned to *Neoleptoneta myopica* following Brignoli (1977) and Platnick (1986). *Texella reddelli* has been found to comprise two species, *Texella reddelli* (Bee Creek Cave harvestman) and *Texella reyesi* (Bone Cave harvestman) (Ubick and Briggs 1992). *Texamaurops reddelli* has been found to comprise two species, *Texamaurops reddelli* (Kretschmarr Cave mold beetle) and *Batrisodes texanus* (Coffin Cave mold beetle) (Chandler 1992). A Federal Register notice announcing the latter two revisions was published on August 18, 1993 (58 FR 43818).

Several caves in Travis County contain more than one of the endangered karst invertebrates. These include Tooth Cave, Amber Cave, Gallifer Cave, Kretschmarr Cave, and Kretschmarr Double Pit. These caves and others are protected under the stewardship of the Texas System of Natural Laboratories (TSNL). In addition, some other caves are in preserves regulated by the Cities of Austin and Georgetown. (For further discussion, see Factor D, "The inadequacy of existing regulatory mechanisms," below.) However, many of the caves containing endangered karst invertebrates currently have no protection other than that provided by the Act.

The petitioners point out that, since publication of the final rule, new locations have been discovered for several of the species, most notably the Tooth Cave ground beetle and the Bone Cave harvestman. The Tooth Cave ground beetle was known from two caves about 2.5 kilometers (km) (1.5 miles (mi)) apart in Travis County, Texas, at the time of listing. It is currently known from about 27 locations (24 confirmed, 3 tentative) along a 14-km (9-mi) distance in Travis and Williamson counties, Texas. Only 10 of these caves are provided any degree of local protection (James Reddell, Texas Memorial Museum, *in litt.*, 1993). Seven of these caves are located in the small TSNL preserves discussed above, one is in a small preserve owned by the City of Austin, and two are in small preserves acquired as mitigation for a development project.

The Bone Cave harvestman was not described at the time of the original listing, but was thought to be the same species as the Bee Creek Cave harvestman. The Bone Cave harvestman is currently known from about 69 locations (60 confirmed, 9 tentative) along a 40-km (25-mi) distance in Travis and Williamson counties, Texas. Of the 69 caves recorded as locations of the Bone Cave harvestman, only 9 are provided any local protection. Three are TSNL caves, two are in City of Austin preserves, two are in City of Georgetown preserves, and two were acquired as mitigation for a development project. In addition, this species exhibits considerable geographical variation and loss of a significant number of locations within a part of its range would result in a loss of genetic diversity within the species (Reddell, *in litt.*, 1993). Few caves are provided any protection other than that now provided by the Act and their distribution is disjunct and at the extremes of the species' range.

The number of caves in which the other five endangered karst invertebrates have been found or tentatively identified has increased slightly for three of the species, remained the same for another species

(although its range has decreased), and decreased for the fifth species.

The Tooth Cave pseudoscorpion, known at the time of listing from Tooth and Amber caves, within a 1.3-km (0.8-mi) radius in Travis County, remains confirmed only from the two original caves. The species has been tentatively identified from Stovepipe Cave and Kretschmarr Double Pit, lying within the original range. Stovepipe Cave is located on private property that the City of Austin has approved for development. The three remaining caves are located in the small TSNL preserves discussed above.

The Tooth Cave spider, known at the time of listing only from Tooth Cave, is now also confirmed at New Comanche Trail Cave and tentatively identified from Gallifer and Stovepipe caves, all lying along a 4.5-km (3-mi) distance in northwest Travis County, Texas. Tooth and Gallifer caves lie within small TSNL preserves, Stovepipe Cave is on private property approved for development, and New Comanche Trail Cave is not protected and may be adversely impacted by a planned realignment of New Comanche Trail Road.

The Coffin Cave mold beetle was not described at the time of listing, but was thought to belong to the same species as the Kretschmarr Cave mold beetle. The Coffin Cave mold beetle is currently confirmed from four caves and tentatively identified from one cave, all occurring along a 17-km (10-mi) distance in Williamson County, Texas. Off Campus and Sierra Vista caves are located in a small preserve surrounded by a subdivision; the adequacy of the preserve for long-term protection of the species at those sites is uncertain. On Campus Cave lies on a high school campus. The status of the type locality (Coffin Cave) is unknown; recent attempts to locate the species in Inner Space Cavern were unsuccessful (Reddell, *in litt.*, 1993).

The Kretschmarr Cave mold beetle was believed to occur in four caves in Travis and Williamson counties at the time of listing and is currently known from four caves in Travis County. A specimen from Coffin Cave was redescribed as the Coffin Cave mold beetle and a new location for the Kretschmarr Cave mold beetle was discovered at Stovepipe Cave. The range of the Kretschmarr Cave mold beetle has consequently decreased since the original listing from a 45-km (28-mi) distance in Travis and Williamson counties to a 2-km (1.2-mi) distance in Travis County. Stovepipe Cave lies within a proposed subdivision and the other three locations for the species, Tooth, Amber, and Kretschmarr caves, lie within small TSNL preserves.

The Bee Creek Cave harvestman was believed to occur in five caves in Travis and Williamson counties at the time of listing. It is currently confirmed at four caves and tentatively identified from two caves. The distribution of the Bee Creek Cave harvestman consists of two disjunct areas, one about 5 km (3 mi) long and the other about 8 km (5 mi) in length, with a distance of about 28 km (17 mi) between the northernmost and southernmost localities, all of which lie in Travis County. Little Bee Creek Cave, Jester Estates Cave, and Kretschmarr Double Pit (a TSNL cave) are located in small preserve areas. Bandit Cave is maintained as a small preserve, although attempts to relocate the Bee Creek Cave harvestman in the cave in 1966, 1988, and 1989 were unsuccessful (Reddell, *in litt.*, 1993). Cave Y is located in a proposed development area; the species' status in Bee Creek Cave is unknown since it has not been possible to obtain permission to inspect the cave since 1975 (Reddell, *in litt.*, 1993).

None of these invertebrates are known to occur in large numbers (William Elliott, Texas Memorial Museum, *in litt.*, 1993; Reddell, *in litt.* and pers. comm., 1993). The fact that several of the species are known to occur at several dozen locations should not be interpreted to mean that those species are abundant. (See Factor A, "The present or threatened destruction, modification, or curtailment of its habitat or range," below).

Summary of Factors Affecting the Species

Section 4(a)(1) of the Act and its implementing regulations (50 CFR part 424) set forth the procedures for adding species to or removing species from the Federal Lists. A species may be determined to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1). These factors and their application to the seven karst invertebrates are re-evaluated in light of new information available to the Service and information presented in the petition and are as follows:

A. The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range

The Service determined that the primary threat to these species comes from loss of habitat due to ongoing and proposed development activities (final rule). The proximity of the caves inhabited by these species to the City of Austin makes them vulnerable to continuing expansion of the Austin metropolitan area. Threats to specific caves occupied by these species were addressed in the final rule (53 FR 36029).

The known ranges of the Tooth Cave pseudoscorpion, the Tooth Cave spider, the Kretschmarr Cave mold beetle, the Coffin Cave mold beetle, and the Bee Creek Cave harvestman have not appreciably increased since the original listing. Although the range and number of known locations for the Tooth Cave ground beetle and the Bone Cave harvestman have increased since the original listing, the degree of threat of habitat destruction or modification remains significant, and may have increased, throughout the range of each species.

Searches for karst features and karst fauna surveys have become more frequent since the listing, as developers and landowners have sought to comply with the Act. Many of the new locations of these karst invertebrates have been discovered as a result of biological surveys conducted prior to development or sale of land; consequently, newly discovered locations are frequently threatened by habitat destruction and other threats associated with development. The recent revitalization of the real estate market in the Austin metropolitan area has maintained and intensified the threat of karst invertebrate habitat destruction and other associated threats.

The petitioners present a list of caves with endangered species that have been subject to some degree of disturbance. They cite these cases as demonstrating that activities such as dumping, vandalism, and sealing of cave entrances do not actually threaten the karst invertebrates. Reddell (in litt., 1993) counters that, in most of these cases, the disturbance to the cave environment is recent in origin, minor in scale, and/or generally restricted to the immediate entrance zone. The Service concurs with Reddell and believes that these examples do not present convincing evidence that dumping, vandalism, and sealing entrances are harmless to the karst invertebrates. In most cases, not enough time has elapsed since the disturbance to detect an effect on the karst invertebrates. The Service agrees with the petitioners that there is little quantitative data available on the direct effects of trash dumping, vandalism, sealing, and other disturbances on the karst invertebrates. However, there is substantial qualitative evidence indicating that the threats to the karst invertebrates discussed in the final rule and in this finding are real, significant, and ongoing. Reddell (*in litt.*, 1993) and

Elliott (*in litt.*, 1993) both cite examples in which trash dumping, vandalism, and over-visitation have resulted in decreased occurrence of karst invertebrates in affected areas.

The petitioners cite the work of Crawford (1981) and Veni (1992) as evidence that the caves where the karst invertebrates occur are not isolated "islands" of special habitat and that the invertebrates likely occur and move throughout the karst in the interstitial spaces. In this interpretation, the petitioners misunderstand the Service's use of the "island" analogy in the final rule. The final rule listing the karst invertebrates stated that the caves containing the karst invertebrates "occur in isolated 'islands' " of the Edwards limestone formation that were separated from one another when stream channels cut through overlying limestone to lower rock layers" (53 FR 36029). The Service applied the island analogy to the distinct, geologically isolated karst areas (referred to in the Draft Recovery Plan (U.S. Fish and Wildlife Service 1993) and hereinafter as "regions") within which the caves containing the karst invertebrates have formed, not to the individual cave systems. Veni's work (1992) delineates these karst regions and identifies areas "having a high probability of suitable habitat for endangered or other endemic invertebrate cave fauna." A letter from Veni in response to the petition clarifies that he did not intend that his work be interpreted to mean that there are thousands of acres of habitat suitable for the karst invertebrates (George Veni, Veni and Associates, *in litt.*, 1993).

While the Service believes that the karst invertebrates are likely to use interstitial spaces in the karst, particularly in areas with some surface nutrient input to the karst system, the Service does not believe that this suitable habitat exists uniformly within the larger karst regions (as delineated by Veni (1992) and described by the Service in the final rule as "islands"). Finally, Crawford (1981) focuses on aquatic karst species. In the aquatic karst ecosystems upon which Crawford based his ideas, continuously flowing water through caves and the interstitium may provide more continuous habitat for aquatic subterranean species and thus provide more opportunity for aquatic invertebrates to inhabit interstitial spaces. Given that the Travis and Williamson County karst invertebrates are exclusively terrestrial and that habitat for terrestrial species is more patchy and distributed according to the occurrence of food, cover, and moisture, Crawford's ideas may not apply to these invertebrates.

The petitioners cite the work of Curl (1966), Juberthei and Delay (1981), and Culver (1986) as evidence that most caves have no entrance, that caves are rare even in karst areas, and that caves may be less favorable environments for karst invertebrates than interstitial spaces. They cite these papers as evidence that habitat for terrestrial troglobites (obligate cave-dwelling species) is ubiquitous in karst areas and that the Texas karst invertebrates exist throughout the karst even where there are no caves or openings to the surface. Culver (1986) says that "the number of caves (defined as cavities large enough for human access) more or less corresponds to the number of habitable patches for terrestrial troglobites." Reddell (*in litt.*, 1993) and Peck (1976) believe that cave entrances provide an important avenue of nutrient input for cave fauna. Reddell (*in litt.*, 1993) also cites several examples in which subsurface voids having no natural entrance were encountered during construction activities and found not to contain karst invertebrates. Similarly, clay-filled sinkholes with no openings to the surface rarely contain karst invertebrates, whereas caves and sinkholes that are sealed to human access by soil or rock fill or with openings to the surface that allow access by cave crickets or small mammals (and associated nutrients) more often contain karst fauna (Reddell, *in litt.*, 1993).

B. Overutilization for Commercial, Recreational, Scientific or Educational Purposes

No threat from overutilization of these species is known to exist at this time. Collection for scientific or educational purposes could become a threat if specific localities become widely known.

C. Disease or Predation

At the time of listing, predation by and competition with non-native species introduced in association with human habitation was considered a potential threat to the karst invertebrates. Human activities facilitate movement of non-native competitors and predators such as sowbugs, cockroaches, and fire ants into an area. Buildings, lawns, roadways, and landscaped areas provide habitat from which these species can disperse. The relative accessibility of the shallow caves in Travis and Williamson counties makes them especially vulnerable to invasion by non-native species.

Fire ants are a major threat to the karst invertebrates. The significance of this threat and the difficulty of controlling fire ants should not be underestimated. Fire ants are voracious predators and there is evidence that overall arthropod diversity drops in their presence (Vinson and Sorensen 1986, Porter and Savignano 1990). Reddell (*in litt.*, 1993) lists at least nine cave-inhabiting species that he has observed being preyed upon by fire ants. Elliott (1992) cites other examples and notes that fire ant activity has increased dramatically in Central Texas since 1989.

Although the threat posed by fire ants was not recognized at the time these species were listed, the magnitude of the threat the ants pose has subsequently become quite apparent. Even in the unlikely event that fire ants do not prey upon the listed species, their presence in and around caves could have a drastic detrimental effect on the cave ecosystem through loss of species, inside the cave and out, that provide nutrient input and critical links in the food chain.

Controlling fire ants once they have invaded the cave and vicinity is difficult. Chemical control methods have some effectiveness but the effect of these agents on non-target species is unclear. Consequently, using chemicals to control fire ants in and near caves is not advisable. Currently, the Service recommends only boiling water treatment for control of fire ant colonies near caves inhabited by listed invertebrates. This method is labor-intensive and only moderately effective. Presently, the burden of carrying out such practices is not a designated or mandated duty of any agency, individual, or organization. This type of control will likely be needed indefinitely or until a long-term method of fire ant control is developed.

D. The Inadequacy of Existing Regulatory Mechanisms

Invertebrates are not included on the Texas Parks and Wildlife Department's list of threatened and endangered species and are provided no protection by the State; nor do the Department regulations contain provisions for protecting habitat of any listed species.

As previously discussed, some of the caves containing endangered invertebrates are in TSNL and city preserves. A small preserve surrounds the entrance to each of these caves. However, these preserves encompass only a fraction of the surface drainage area that provides input of nutrients and moisture into the caves. The entire surface and subsurface drainage area is the minimum area believed necessary to provide adequate long-term protection for cave ecosystems. The preserves around these caves are not sufficient to counter nutrient depletion and prevent

pollution, should the surrounding areas be developed.

Some of the TSNL caves are under temporary deed to TSNL and may be sold at the owner's discretion (U.S. Fish and Wildlife Service 1993). In addition, City of Austin cave protection laws do not apply in most cases, since the great majority of these caves lie outside the city limits.

E. Other Natural or Manmade Factors Affecting Its Continued Existence

The Service is unaware of other threats to these species beyond those discussed under factors A–D (above). As noted under Factor A, the Bone Cave harvestman exhibits considerable geographical variation. Loss of a number of locations within any one part of its range would result in a loss of genetic diversity for the species (Reddell, *in litt.*, 1993). The Tooth Cave pseudoscorpion, Tooth Cave spider, Coffin Cave and Kretschmarr Cave mold beetles, and Bee Creek Cave harvestman are each known from fewer than 10 locations (4, 4, 5, 4, and 6 locations respectively, including unconfirmed identifications). Therefore, the loss of even a single location would represent a significant loss of genetic diversity for any of those species. Lack of genetic diversity can accelerate the decline or extinction of rare species.

Conclusion

As discussed in the final rule, these species remain extremely vulnerable to losses. For the Tooth Cave pseudoscorpion, the Tooth Cave spider, the Kretschmarr Cave mold beetle, the Coffin Cave mold beetle, and the Bee Creek Cave harvestman, neither the range nor the number of confirmed localities within the range has expanded significantly since the original listing. The Tooth cave ground beetle and the Bone Cave harvestman occur in more locations and are more widespread than was originally believed, but the expansion of the overall range is not significant and the majority of caves in which these species occur are subject to one or more of the threats discussed above (Reddell, *in litt.*, 1993).

The Service recently released a Draft Recovery Plan for the karst invertebrates (U.S. Fish and Wildlife Service 1993). That document details recovery actions and criteria that, when met, may result in reclassification or delisting of the endangered karst invertebrates. Continued efforts to locate new inhabited caves, to implement habitat conservation measures, and to control the threat of fire ants could bring the karst invertebrates to the point where protection under the Act is no longer necessary.

The Service has carefully assessed the information presented in the petition, as well as the best and most current scientific and commercial information, in determining that the petition does not present substantial scientific and commercial information indicating that delisting of any of the seven karst invertebrates may be warranted. These species continue to require the protection provided by the Act because of their extremely small, vulnerable, and limited habitats located within an area that is experiencing continued pressures from economic and population growth.

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Author

The primary author of this notice is Ruth Stanford (See **ADDRESSES** section).

Authority

The authority for this action is the Endangered Species Act of 1973, as amended (16 U.S.C. 1531–1544).

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, and Transportation.

Dated: March 7, 1994.

Mollie H. Beattie,

Director, Fish and Wildlife Service.

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